PB84-148980

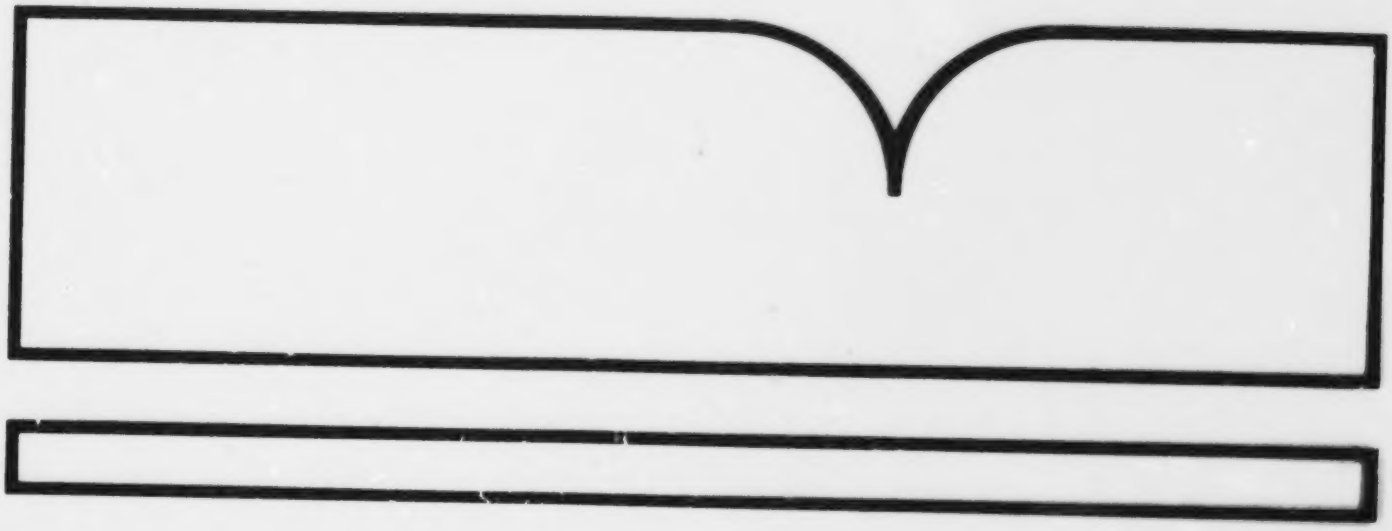
Organic Dyes and Pigments Data Base

SRI International, Menlo Park, CA

Prepared for

Industrial Environmental Research Lab.
Cincinnati, OH

Jan 84



U.S. Department of Commerce
National Technical Information Service
NTIS

PB84-145980

EPA-600/2-84-032
January 1984

THE ORGANIC DYES AND PIGMENTS DATA BASE

by

L. Swett, A. Twhigg,
and K. E. McCaleb
SRI International
Menlo Park, California 94025

Contract No. 68-03-2944

Project Officer

Mark J. Stutsman
Industrial Pollution Control Division
Industrial Environmental Research Laboratory
Cincinnati, Ohio 45268

INDUSTRIAL ENVIRONMENTAL RESEARCH LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
CINCINNATI, OHIO 45268

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA-600/2-84-032	2.
3. RECIPIENT'S ACCESSION NO. PB84 148980	
4. TITLE AND SUBTITLE THE ORGANIC DYES AND PIGMENTS DATA BASE	5. REPORT DATE January 1984
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) L. Swett, A. Twhigg and K. E. McCaleb	8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS SRI International 333 Ravenswood Avenue Menlo Park, CA 94025	10. PROGRAM ELEMENT NO.
	11. CONTRACT/GRANT NO. 68-03-2944
12. SPONSORING AGENCY NAME AND ADDRESS Industrial Environmental Research Laboratory-Ci Office of Research and Development U. S. Environmental Protection Agency Cincinnati, OH 45268	13. TYPE OF REPORT AND PERIOD COVERED
	14. SPONSORING AGENCY CODE EPA/600/12
15. SUPPLEMENTARY NOTES	

16. ABSTRACT

The objective of this research program was to compile a data base covering all the commercially significant dyes and pigments produced or imported in the United States.

The Organic Dyes and Pigments Data Base (ODPDB) contains the following data elements: chemical-related data (consisting of synonyms, identifiers, and descriptions of manufacturing processes, end uses, and manufacturing waste-water emissions); toxicity data (comprised of NIOSH registry numbers, threshold limit values and various standard test data); economic data on production and sales; and producer-related data (made up of company and plant site identifiers, their locations, and the associated river basins).

Data were compiled on 1434 commercial products from a variety of sources, including on-line information retrieval systems, government statistical and research publications, standard industry handbooks, and in-house technical expertise. Correlation of data is accomplished by means of a System 2000® data base management system, which permits retrieval on the basis of various "key" data elements.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group

18. DISTRIBUTION STATEMENT RELEASE TO PUBLIC	19. SECURITY CLASS *(This Report)* UNCLASSIFIED	21. NO. OF PAGES 52
	20. SECURITY CLASS *(This page)* UNCLASSIFIED	22. PRICE

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE

NOTICE

This document has been reviewed in accordance with U.S. Environmental Protection Agency policy and approved for publication. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

FOREWORD

When energy and material resources are extracted, processed, converted, and used, the related pollutional impacts on our environment and even on our health often require that new and increasingly more efficient pollution control methods be used. The Industrial Environmental Research Laboratory - Cincinnati (IERL-CI) assists in developing and demonstrating new and improved methodologies that will meet these needs both efficiently and economically.

The Organic Dyes and Pigments Data Base was developed as a specialized extension of the existing Organic Chemical Producers Data Base focusing on the commercial products of a particular industry. The data are assembled so that specific products and the wastewater emissions associated with their manufacture may be correlated with plant site locations and the river basins in which the effluents are deposited. This type of information should be especially significant to chemical engineers concerned with wastewater treatment and to aquatic environment ecologists. The Industrial Pollution Control Division may be contacted for further information on the Organic Dyes and Pigments Data Base.

David G. Stephan
Director
Industrial Environmental Research
Laboratory
Cincinnati

ABSTRACT

The objective of this research program was to compile a data base covering all the commercially significant dyes and pigments produced or imported in the United States.

The project was designed to be a supplement to the already extant Organic Chemical Producers Data Base. Whereas the latter included large-volume chemicals of general industrial use, the Organic Dyes and Pigments Data Base was restricted to products within the narrow scope of a single end use category, but used a much lower annual production figure as the criterion for inclusion in the data base.

The data elements contained in the OCPDB were retained with certain modifications and additions; these elements were grouped under the following headings: chemical-related data (consisting of synonyms, identifiers, and descriptions of manufacturing processes, end uses, and manufacturing wastewater emissions); toxicity data (comprised of NIOSH registry numbers, threshold limit values and various standard test data); economic data on production and sales; and producer-related data (made up of company and plant site identifiers, their locations, and the associated river basins).

Data were compiled on 1434 commercial products from a variety of sources, including on-line information retrieval systems, government statistical and research publications, standard industry handbooks, and in-house technical expertise. Correlation of data is accomplished by means of a System 2000® data base management system, which permits retrieval on the basis of various "key" data elements.

This report was submitted in fulfillment of Contract No. 68-03-2944 by SRI International under the sponsorship of the U.S. Environmental Protection Agency. The report covers the period from May 1, 1980, to January 21, 1983, and the work was completed as of January 21, 1983.

CONTENTS

Foreword iii
Abstract iv
Tables vi
Acknowledgments vii

1. Introduction 1
2. Conclusions 3
3. Scope of the Organic Dyes and Pigments Data Base (ODPDB) . . . 5
4. Data Collection 7
   Approach 7
   Chemical Identification 7
      Colour Index Name 8
      CAS Numbers and Synonyms 8
      Wiswesser Line Notation 9
   Economic Data 9
   Producer-Related Data 10
      Company Name, Plant Location, Plant Production Range, Plant Capacity, and Parent Company 11
      Plant Production Range 11
      River Basin Code and Name 11
   Process-Related Data 12
      Process Description 12
      Process IPPEU Number 13
      Emission Description 13
   Use Data 13
   Toxicity Data 14
5. Data Format and Transmittal 16
   Data Format 16
      Chemical Identification 16
      Economic Data 16
      Producer-Related Data 16
      Process-Related Data 17
      Use Data 17
      Toxicity Data 17
   Computer Entry and Transmittal 17
      Keypunch Coding Sheets 17
      Entry Program 17
      Editing 18

Appendices

A. 1978-1979 U.S. Imports of Dyes and Pigments in the ODPDB . . . 19
B. Codes to Production Ranges in the ODPDB 43

TABLES

Number		Page
1	Data Elements in the OCPDB at the Start of this Project.	2
2	Subtasks of the Organic Dyes and Pigments Data Base.	7

ACKNOWLEDGMENTS

The cooperation of staff in SRI International's Chemical-Biological Information Program, under the direction of Dr. Caroline C. Sigman, is gratefully acknowledged for assistance in obtaining toxicity data.

Ms. Maria A. Geigel of the Organic Chemistry Laboratory at SRI International contributed valuable information on process descriptions and determination of emission factors.

Mr. Stanley Isaacs, a Computer Applications Analyst in SRI's Computer Resources Division, was responsible for devising a directed data entry and sorting program which saved a large amount of time and effort.

Dr. Kurt Loening of the Chemical Abstracts Service Division of the American Chemical Society provided systematic names for some chemical structures that were otherwise unobtainable.

SECTION 1

INTRODUCTION

In 1976, the U.S. Environmental Protection Agency established the Organic Chemical Producers Data Base (OCPDB), a computerized information system which contained data on about 380 high volume industrial organic chemicals and their production sites. In 1979, the OCPDB was expanded to over 600 chemicals and 1400 producers, and it was placed on System 2000®, a data base management system. (System 2000 is a registered trademark of Intel Corporation.) A listing of the data elements in the OCPDB at the time the work on this project was started is given in Table 1.

The IERL has since decided to develop extensions of the OCPDB to include data on selected additional chemicals. The first new category, which is covered by this report, is economically significant organic dyes and pigments. The data elements and format of the existing OCPDB were utilized, with only minor modifications, to develop the Organic Dyes and Pigments Data Base (ODPDB).

TABLE 1. DATA ELEMENTS IN THE OCPDB AT THE START OF THIS PROJECT

Entry type	Data Element
	Entry I.D.
Chemical-related data	Chemical names
	CAS numbers
	New chemical markers
	Priority pollutant markers
	Wiswesser line notation
	Process I.D.
	Process description
	IPPEU numbers
	Uses description
	Use volume
	Use by % consumption
	Use IPPEU numbers
	Synonyms
	Emission description
	Emission rating
Toxicity data	NIOSH registry number
	LD_{50} mode
	LD_{50} species
	LD_{50} amount
	LD_{50} units
	LD_{LO} mode
	LD_{LO} species
	LD_{LO} amount
	LD_{LO} units
	AQTX
	TLV
	TLV units
	Sax ratings
Economic data	Year
	Production volume
	Unit cost
	Sales value
Producer-related data	Plant ID
	Plant capacity
	Company names
	Cities
	States
	River basin
	River basin code
	Parent companies

SECTION 2

CONCLUSIONS

The efforts on the Organic Dyes and Pigments Data Base (ODPDB) have resulted in a body of information on 1434 distinct chemical products. This compilation includes all of the synthetic organic colorants produced or imported in the United States in 1978-79 at commercially significant levels for which structural data were available. It is believed to be the only comprehensive body of data on this sector of the chemical industry, embracing chemical, economic, use, toxicity, process-related, and producer-related categories of information. In addition to the data elements included in the OCPDB, use was made of EPA's CICIS data base to supply manufacturers' production ranges and of NIOSH's RTECS for the most current on-line toxicological data.

The majority of the problems in data collection were encountered in obtaining data and were due to the proprietary nature of the dye and pigment industry. Although each industry within the organic chemicals industry will have problems unique to that industry, some of the solutions discussed in Section 3 may be useful in future studies. The other more minor difficulties in obtaining data could easily arise again, but are of little consequence.

SECTION 3

SCOPE OF THE ORGANIC DYES AND PIGMENTS DATA BASE (ODPDB)

To define the scope of this task, qualifying criteria were developed for including dyes and pigments in the data base. These criteria were based on economic and structural considerations.

The economic criteria allow only commercially significant candidates to be included in the data base. Commercial significance is defined, for the purpose of this study, as recent (1978 or 1979) U.S. production or imports of greater than 5,000 pounds for dyes and 1,000 pounds for pigments.[a]

Candidates meeting the economic criteria fell into two groups: those for which chemical structure could and could not be identified. The candidates without structures but identified by a Colour Index name were included, since all data elements except for process-related data could be found. All candidates with identified structures were included. All salt forms meeting the criteria were included individually, not as subcategories of the parent dyes and pigments, since the data were unique for each form. In the cases where more than one pigment or dye application type (e.g., acid, direct, or vat dye) was associated with a single chemical structure, each dye or pigment was included separately in all the forms which met the qualifying criteria.

The sources reviewed in establishing the scope of the study were as follows:

The Society of Dyers and Colourists. Colour Index. London, England:

1971. Third Edition, Volumes 1-5
1975. Revised Third Edition, Volume 6
1974-1980. Revised Third Edition. Additions and Amendments. Numbers 13-36

U.S. International Trade Commission. 1979 and 1980. Imports of Benzenoid Chemicals and Products, 1978 and 1979. USITC Publication Numbers 990 and 1083. U.S. Government Printing Office. Washington, D.C.

a. These minimum values are the same as those set by the U.S. International Trade Commission in their publication, Synthetic Organic Chemicals, U.S. Production and Sales.

Preceding page blank

U.S. International Trade Commission. 1979 and 1980. Synthetic Organic Chemicals, U.S. Production and Sales, 1978 and 1979. USITC Publication Numbers 1001 and 1009. U.S. Government Printing Office. Washington, D.C.

SECTION 4

DATA COLLECTION

APPROACH

The task was divided into nine subtasks in which the 1434 colorants were grouped by their structural similarities. These subtasks and the number of colorants in each are listed in Table 2. This grouping assisted in the collection of the data; however, this breakdown is not represented in the ODPDB.

TABLE 2. SUBTASKS OF THE ORGANIC DYES AND PIGMENTS DATA BASE

Subtask number	Structural class	Number of colorants
1	Benzidine and its congeners	69
2	Monazo	383
3	Anthraquinone	200
4	Disazo, trisazo, polyazo, and unspecified azo	337
5	Stilbene and azoic	95
6	Triarylmethane, diphenylmethane, and xanthene	94
7	Acridine, quinoline, thiazole, methine, azine, oxazine, thiazine, nitroso, and nitro	86
8	Sulfur, aminoketone, indigoid, and phthalocyanine	83
9	Undisclosed (proprietary) structure	87
		1434

CHEMICAL IDENTIFICATION

This step involved identifying the dyes and pigments by their Colour Index name, Chemical Abstract Service Registry Number (CAS number), synonyms, and Wiswesser Line Notation (WLN).

Colour Index Name

With the exception of Subtask 1. Benzidine and Its Congeners Dyes and Pigments, the following sources were used to obtain Colour Index names:

Marmion, D. M. 1979. Handbook of U.S. Colorants for Foods, Drugs, and Cosmetics, Wiley-Interscience Publications, New York

The Society of Dyers and Colourists. Colour Index. London, England:
1971. Third Edition, Volumes 1-3 and 5
1975. Revised Third Edition, Volume 6
1974-1980. Revised Third Edition. Additions and Amendments. Numbers 13-36

A number of sources were available which were exclusively on the colorants covered in Subtask 1. These sources, listed below, were used to obtain Colour Index names for Subtask 1:

Dyes Environmental and Toxicology Organization (DETO). 1979. Bisazobiphenyl Dyes Currently on the U.S. Market. July 1979

Lapp, T. W., et al. 1979. Chemical Technology and Economics in Environmental Perspective. Task V--A Preliminary Materials Balance for Dyes and Pigments from Benzidine and Three Benzidine Derivatives. Midwest Research Institute Draft Final Report. U.S. Environmental Protection Agency, Office of Toxic Substances. Washington, D.C., August 31, 1979

National Institute for Occupational Safety and Health (NIOSH). 1980. Special Hazard Review of Benzidine-Based Dyes. Washington, D.C., January 1980

National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA). 1980. Health Hazard Alert, Benzidine-, o-Tolidine- and o-Dianisidine-Based Dyes. Washington, D.C.

Powell, R., et al. 1979. Survey of the Manufacture, Import, and Uses for Benzidine, Related Substances, and Related Dyes and Pigments, JRB Associates, Inc. Final Report. U.S. Environmental Protection Agency, Office of Toxic Substances. EPA-560/13-79-005. Washington, D.C., April 1979

CAS Numbers and Synonyms

CAS numbers and current synonyms for the dyes and pigments in all subtasks were obtained from the following sources:

CHEMLINE. National Library of Medicine

Toxic Substances Control Act Chemical Substance Inventory. Initial Inventory. U.S. Environmental Protection Agency. Office of Toxic Substances. May 1979

The American Association of Textile Chemists and Colorists. 1980. Textile Chemist and Colorist AATCC Buyers Guide. Volume 12. No. 7A. Research Triangle Park, North Carolina. July 1980

Initially, all synonyms (current and obsolete) were collected. The lists of synonyms became quite lengthy, and therefore only the synonyms known to be used by current manufacturers were included in the data base. No sources were available to determine which synonyms were used by current importers.

Wiswesser Line Notation

The sources listed below were reviewed to secure Wiswesser Line Notations (WLN) for all subtasks:

Markle, R. T., et al. 1976. Potentially Toxic and Hazardous Substances in the Industrial Organic Chemicals and Organic Dyes and Pigments Industries. Battelle-Columbus Laboratories Final Report. U.S. Environmental Protection Agency, Industrial Environmental Research Laboratories

National Institute for Occupational Safety and Health. 1978. Registry of Toxic Effects of Chemical Substances. Rockville, Maryland

In almost all cases, WLN were not available. No effort was made to derive WLN for chemicals lacking them.

ECONOMIC DATA

The economic data that were collected included 1979 figures (or 1978, if 1979 figures were not available) for production, imports, sales value, and unit cost. The sources reviewed for economic data included:

Boeniger, M. 1980. The Carcinogenicity and Metabolism of Azo Dyes, Especially Those Derived from Benzidine. National Institute for Occupational Safety and Health. NIOSH Technical Report DHHS 80-119. July 1980

National Institute for Occupational Safety and Health (NIOSH). 1980. Special Hazard Review of Benzidine-Based Dyes. January 1980

U.S. Environmental Protection Agency (EPA). 1980. TSCA Chemical Assessment Series. Preliminary Risk Assessment: Phase 1, Benzidine, Its Congeners and Their Derivative Dyes and Pigments. EPA-560/11-80-019. June 1980

U.S. International Trade Commission. 1979 and 1980. Imports of Benzenoid Chemicals and Products, 1978 and 1979. USITC Publication Numbers 990 and 1083. U.S. Government Printing Office. Washington, D.C.

U.S. International Trade Commission. 1979 and 1980. Synthetic Organic Chemicals, U.S. Production and Sales, 1978 and 1979. USITC Publication Numbers 1001 and 1009. U.S. Government Printing Office. Washington, D.C.

Actual production figures were not available for the majority of colorants. Instead, production was expressed in terms of a minimum figure of 5,000 pounds multiplied by the number of listed producers, e.g., "greater than 20,000 pounds" when four companies reported production to the U.S. International Trade Commission (USITC). Production data reported to the USITC are for the commercial product, which may include solvents, other diluents, and impurities in addition to the specific dye chemical of interest; concentration of the organic dye in the commercial product may vary from 10% to 100%.

It was originally intended that all commercially significant dyes and pigments be included in the ODPDB, regardless of whether they were produced in the United States or imported, and additional data elements were to be included specifying the volume and year of importation. It was later decided that the ODPDB would be restricted to data on U.S. production, and that the collected imports data be appended to the Final Report in tabular form. Other data elements relating to the imported dyes and pigments were to remain in the ODPDB, which gives rise to situations in which a substantial number of otherwise complete entries in the data base apparently lack any economic data and producer identifiers. This occurs for all dyes and pigments which were imported at commercially significant levels in the years of interest but had no U.S. production in thos years.

The sole source[a] reporting import figures for individual colorants gives only imports through principal U.S. customs districts and, therefore, does not completely portray all imports. (Only the colorants for which imports were reported at greater than 5,000 pounds for dyes and 1,000 pounds for pigments are included in Appendix A.)

PRODUCER-RELATED DATA

The producer-related data that were sought included company name, plant location, plant production range, plant capacity, parent company, and "river basin" (state hydrological unit) code and name. Since none of the dye and pigment plants was in the OCPDB, the producer-related data already in the OCPDB were not used.

---

a. U.S. International Trade Commission. 1979 and 1980. Imports of Benzenoid Chemicals and Products, 1978 and 1979. USITC Publication Numbers 990 and 1083. U.S. Government Printing Office. Washington, D.C.

Company Name, Plant Location, Plant Production Range, Plant Capacity, and Parent Company

The company names obtained corresponded to those producers reporting production in the years included in the data base (i.e., either 1979 or 1978). The sources searched for company name, plant location, plant production range, and parent company were as follows:

U.S. International Trade Commission. 1979 and 1980. Synthetic Organic Chemicals, U.S. Production and Sales, 1978 and 1979. USITC Publication Numbers 1001 and 1009. U.S. Government Printing Office, Washington, D.C.

SRI International. 1979 and 1980. Directory of Chemical Producers-U.S.A., 1979 and 1980. Menlo Park, California

The first of these sources provided company names for specific colorants, but did not give plant locations or parent company names; the second source was used to match company names with their respective plant locations and parent companies, but it did not include individual colorants in the company product slates. As a result, information gaps occasionally occurred. For example, when more than one dye plant location was listed for one company in the second source, it was not known which locations were manufacturing which colorants. In those instances, all locations were included in the data base.

Since the dye industry has been changing rapidly in the last few years, the company names, their plant locations, and parent companies for the years 1978 and 1979 are currently inaccurate in some cases. Several companies have either gone out of business, changed names or parent companies, or sold out to other companies, sometimes splitting ownership among companies. No attempt was made to indicate changes in company data occurring after 1979.

Plant Production Range

A new data element, plant production range, was included in the Organic Dyes and Pigments Data Base. U.S. production ranges for individual plant sites are reported for 1977 in the U.S. Environmental Protection Agency's nonconfidential files of the TSCA Chemicals in Commerce Information System (CICIS) data base. These production ranges and the code letters assigned to them are listed in Appendix B.

River Basin Code and Name

A combination of the following sources were used to obtain "river basin" (state hydrological unit) codes and names:

Commercial Atlas & Marketing Guide. 1979-1981. 110th-112th Editions. Rand McNally & Co. Chicago, Illinois

U.S. Geological Survey (USGS). 1979-1980. Catalog of Information on Water Data. Index to Water Data Acquisition. Water

Resources Divisions 01-07, 11 and 18. Office of Water Data Coordination, Reston, Virginia

U.S. Geological Survey (USGS). Water Resources Division. Computer printout: State hydrological unit codes and names. Retrieved April 1981. Menlo Park, California

Since no index was available in the OCPDB to connect plant locations (either by state or city) with river basin codes or names, the river basin information in the OCPDB could not be used. The sources listed for river basin codes and names in the OCPDB documentation were described vaguely and were, therefore, difficult to locate. This difficulty was compounded by the fact that the USGS does not use the term "river basin," but rather "state hydrological unit" code and name. Also, at the time our research began, a new edition of the USGS source for state hydrological unit codes was in the process of publication. The new volumes became available, a few at a time, over several months; so our research was delayed until all volumes needed had appeared. State hydrological unit names were not listed in this source. After several phone conversations with different individuals at the USGS, a computer printout containing river basin names was finally located. All of these factors made data collection on this subject especially difficult, and may have created inaccuracies in cases where plant sites were located on the boundaries between two state hydrological units.

PROCESS-RELATED DATA

This task dealt with describing the processes used to manufacture the colorants, determining the method of manufacture used at each plant, listing the emissions from process waste streams, and finding Process IPPEU numbers for each process.

Process Description

The primary source used to find specific processing descriptions was Colour Index (Volumes 4, 6, and the Additions and Amendments). Other sources were consulted but these contained process information primarily on general classes of colorants and only occasionally provided information on specific dyes and pigments. These sources included:

Abrahart, E. N. 1977. Dyes and Their Intermediates. Second Edition. Chemical Publishing Co. New York

Byers, W. L., et al. 1978. Benzidine Derived Dyes and/or Pigments. Auerbach Associates, Inc. Final Monograph. U.S. Consumer Product Safety Commission. Contract No. CPSC-C-77-0088. Washington, D.C.

Lubs, H. A. 1955. The Chemistry of Synthetic Dyes and Pigments. American Chemical Society Monograph No. 127. Van Nostrand Reinhold Co. New York

Marmion, D. M. 1979. Handbook of U.S. Colorants for Foods, Drugs, and Cosmetics. Wiley-Interscience Publications. New York

Venkataraman, K. 1979. The Analytical Chemistry of Synthetic Dyes. Wiley-Interscience Publications. New York

The major dye intermediates used in the processing methods were compared with the product slates of the plants manufacturing each colorant. When the product slates from any plant indicated that the plant manufactured the key intermediates, the process was annotated with the suffix "PR" for "probable process." If none of the product slates included the dye intermediates, the process was labeled "PS" for "possible process." Product slates for dye and pigment manufacturing plants were found in SRI International's 1979 and 1980 Directory of Chemical Producers-USA.

Process IPPEU Number

Process IPPEU numbers from Industrial Process Profiles for Environmental Use, Chapter 7, Organic Dyes and Pigments Industry* were included when available. IPPEU numbers were not necessarily available for single colorants, but rather for ranges of structurally similar dyes and pigments; in these cases the IPPEU number for the range was used for each individual colorant.

Emission Description

Possible emissions were identified from the process description for each colorant. The key intermediates and organic and inorganic salts described in the processing method, as well as the colorant, were listed as emissions. In methods where more than one step was involved, only those intermediates used in the last step of manufacture were determined and included as emissions. When chemical names for these structures could not be derived, Dr. Kurt Loening of the Chemical Abstract Service in Columbus, Ohio, was contacted to obtain International Union of Pure & Applied Chemistry (IUPAC) names.

No sources were available to identify either actual or theoretical emissions or to provide any quantitative data on emissions.

USE DATA

This step involved gathering data for use descriptions and for consumption (by volume and as a percent of total consumption). The Colour Index was the primary source searched for use information. However, the uses given in Colour Index are not indicative of actual current use, so other sources were consulted to substantiate this information. When the uses could not be confirmed, the description was annotated with "PS" for "possible use." The sources other than Colour Index which were searched for use descriptions and consumption data were:

Byer, W. L., et al. 1978. Benzidine Derived Dyes and/or Pigments. Auerbach Associates, Inc. Final Monograph. U.S. Consumer Products Safety Commission. Contract No. CPSC-C-77-0088. Washington, D.C.

*EPA-600/2-77-023g February 1977. Environmental Protection Technology Series.

Food and Drug Administration. 1978. Voluntary Cosmetics Regulatory Program. Cosmetics Registration File. Washington, D.C.

Lapp, T. W., et al. 1979. Chemical Technology and Economics in Environmental Perspective. Task V--A Preliminary Materials Balance for Dyes and Pigments from Benzidine and Three Benzidine Derivatives. Midwest Research Institute. Draft Final Report. U.S. Environmental Protection Agency, Office of Toxic Substances. Washington, D.C.

Marmion, D. 1979. Handbook of U.S. Colorants for Foods, Drugs, and Cosmetics. John Wiley & Sons, Inc. New York

Modern Plastics Encyclopedia, 1979-1980. 1979. Volume 56. No. 10A. McGraw-Hill Publications. New York

National Academy of Sciences. 1979. The 1977 Survey of Industry on the Use of Food Additives. Washington, D.C.

Office of the Federal Register. April 1980. Code of Federal Regulations. Title 21. Sections 74-82. U.S. Government Printing Office. Washington, D.C.

Patton, T. C., ed. 1973. Pigment Handbook. Volume 1. John Wiley & Sons, Inc. New York

Powell, R., et al. 1979. Survey of the Manufacture, Import, and Uses for Benzidine, Related Substances, and Related Dyes and Pigments. JRB Associates, Inc. Final Report. U.S. Environmental Protection Agency, Office of Toxic Substances. Washington, D.C.

Sheldrick, J. E., et al. 1979. Product/Industry Profile: Dyes Based on Benzidine and Benzidine Congeners. Battelle-Columbus Laboratories. Final Report. U.S. Consumer Product Safety Commission. CPSC-C-78-0091. Washington, D.C.

1981 Rubber Red Book. 33rd Edition. Directory of the Rubber Industry. Communication Channels, Inc. Atlanta, Georgia.

The main difficulty encountered in this step was that no sources, other than Colour Index, gave textile use information. Since no substantiation was found, all information on colorant use in textiles is labeled "possible use." Also, with the exception of a handful of colorants in Subtask 1, data on consumption by percent or volume were not available.

TOXICITY DATA

In this step, information was found in the NIOSH (1978) Registry of Toxic Effects of Chemical Substances on NIOSH Registry Number, Lethal Dose 50% (LD_{50}), and Lethal Concentration Low (LC_{LO}). Results from standard

96-hour aquatic toxicity tests (AQTX) were obtained from the the American Dye Manufacturers Institute's 1974 publication, Dyes and the Environment. Reports on Selected Dyes and Their Effects. Volume II.

Threshold Limit Values (TLV's) to limit worker exposure to colorants in the workplace air in any eight-hour work shift of a forty-hour work week were sought in Occupational Safety and Health Administration (OSHA) regulations and in standards recommended by the National Institute for Occupational Safety and Health (NIOSH) and by the American Conference of Governmental Industrial Hygienists (ACGIH), but no data were found.

SECTION 5

DATA FORMAT AND TRANSMITTAL

DATA FORMAT

The data collected in the previously described steps were put into a format suitable for addition to the already operational OCPDB. Some of the data (e.g., CAS numbers, synonyms, and sales value) were entered in the same format as data already in the OCPDB. In other cases, minor modifications (described below) were made to the data format and field lengths in order to create the Organic Dyes and Pigments Data Base.

Chemical Identification

The prefix "D" was added to the Colour Index name of each dye and pigment to distinguish them from the chemicals already in the Organic Chemical Producers Data Base. Five-digit entry I.D. numbers were assigned to the dyes and pigments such that the colorants were listed alphabetically within each subtask. An attempt was made to assign four-digit entry I.D. numbers (as the chemicals in the OCPDB had been assigned) and place the colorants in their proper alphabetical location in the OCPDB. Two problems arose with this approach: (1) this task was divided into subtasks, performed consecutively, so that the names of all the dyes and pigments were not known until the final subtask was under way, and (2) the gaps between numbers in the OCPDB were nearly always insufficient to accommodate all of the new entry I.D. numbers.

Economic Data

Actual production figures were not available for the majority of the dyes and pigments; however, data on the number of producers were available which permitted minimum production figures to be stated. In these cases the symbol " > " was used to preface the production figure.

The data base was not redefined to include volume or year of imports. Instead, imports data are given in Appendix A of this report.

Producer-Related Data

A new data element with a field length of one character was created for production range and located next to plant I.D. in the data base. A code letter was assigned to each of the thirteen production ranges in CICIS. These ranges and their respective code letters are listed in Appendix B.

Process-Related Data

The 2-digit IPPEU Number was prefaced with "7" to specify that the number was extracted from "Industrial Process Profiles for Environmental Use. Chapter 7. The Organic Dyes and Pigments Industry." The suffix "PR" was added to the process description to designate a "probable process"; and the suffix "PS" was added to indicate a "possible process" (see Section 4 on Process-Related Data for a definition of these terms).

The field length for emission factors was expanded to 150 characters to accommodate the lengthy dye intermediate names.

Use Data

The suffix "PS" was added to the use description to indicate a "possible use" (see Section 4 on Use Data for an explanation of this term).

Toxicity Data

The field length for the NIOSH Registry Number was expanded to 9 characters since the NIOSH Registry of Toxic Effects (the source for NIOSH Numbers) had been updated. The field lengths for LD_{LO} and LD_{50} were expanded to 17 characters to accommodate the data found for the dyes and pigments.

COMPUTER ENTRY AND TRANSMITTAL

Initial arrangements were made to use the Burroughs B6700 operating system for data storage, since this was the only hardware available at SRI compatible in language with the System 2000®. Subsequently it became necessary to switch operations to the VAX 11-780, a Data Equipment Corp. (DEC) product, when the decision was made to implement a direct data entry program; the program had to be written in PASCAL, which is not compatible with EPA's software. This more complicated series of interfaces allowed the keypunch cards to be produced by means of the B6700, thereby restoring the compatibility.

Keypunch Coding Sheets

Coding sheets were initially developed based on the ordering of data elements in the OCPDB, and formatted to permit SRI keypunchers to process the data with a minimal amount of interfacing. However, the labor involved in transferring all of the data from the collection worksheets to these coding sheets proved excessive, so another method was sought whereby entry could proceed directly from the existing worksheets.

Entry Program

A program was specially designed in SRI's Computer Resources Division to provide a means for clerical staff to enter data directly from the collection worksheets. This featured a simple "keying" mechanism for each data element similar to a question-and-answer format, built-in space limitations, and a "descrambling" sequence which converted

the entry order, i.e., that of the worksheet, into feed order appropriate to the System 2000®. The outstanding feature, however, was a subroutine enabling all of the producer-related data from a prepared memory to be keyed to entry of the plant ID number; this innovation afforded large savings in time and labor.

Editing

Editing proceeded in two phases: a pre-entry phase necessary to modify the collected raw data into a format consistent with the coding sheet data elements and space limitations, and a post-entry phase to resolve computer transmission and typographical errors. The latter was accomplished via a CRT Terminal using a Data Equipment Corp. (DEC) editing program, EMACS.

APPENDIX A

1978-1979 U.S. IMPORTS OF DYES AND PIGMENTS IN THE ODPDB

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 1. Benzidine and Its Congeners Dyes and Pigments			
10005	C.I. Acid Black 209	-	5,092
10030	C.I. Acid Red 111	6358-57-2	17,803
10065	C.I. Azoic Coupling Component 5	-	20,290
10070	C.I. Azoic Diazo Component 48	-	9,391
10090	C.I. Direct Black 38	1937-37-7	327,737
10095	C.I. Direct Black 114	-	24,780
10110	C.I. Direct Blue 2	2429-73-4	70,306
10130	C.I. Direct Blue 15	2429-74-5	7,496
10180	C.I. Direct Blue 158	6655-95-4	13,228[b]
10185	C.I. Direct Blue 160	-	19,836[b]
10200	C.I. Direct Brown 2	2429-82-5	13,255
10220	C.I. Direct Brown 95	6071-86-6	22,217
10270	C.I. Direct Red 28	573-58-0	19,518
10285	C.I. Direct Red 89	-	10,010[b]
10295	C.I. Direct Yellow 68	-	25,498
10300	C.I. Direct Yellow 95	-	11,464
10325	C.I. Pigment Orange 34	15793-73-4	24,324
10330	C.I. Pigment Red 38	6358-87-8	13,530
10340	C.I. Pigment Yellow 12	6358-85-6	99,738

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 1. Benzidine and Its Congeners Dyes and Pigments (continued)			
10345	C.I. Pigment Yellow 13	5102-83-0	19,834
10350	C.I. Pigment Yellow 14	5468-75-7	6,996
Subtask 2. Monazo Dyes and Pigments			
10370	C.I. Acid Black 52	5610-64-0	10,362
10375	C.I. Acid Black 60	12218-95-0	10,141
10380	C.I. Acid Black 63	32517-36-5	102,493
10385	C.I. Acid Black 107	12218-96-1	8,783
10390	C.I. Acid Black 172	-	15,653
10395	C.I. Acid Black 177	-	38,610
10400	C.I. Acid Black 188	-	5,000[b]
10415	C.I. Acid Blue 158	6370-08-7	6,600[c]
10420	C.I. Acid Blue 158:1	-	6,600[c]
10430	C.I. Acid Blue 193	-	27,995
10435	C.I. Acid Blue 229	-	5,510
10440	C.I. Acid Blue 284	-	25,531
10460	C.I. Acid Brown 224	-	5,840
10465	C.I. Acid Brown 226	-	14,259
10470	C.I. Acid Brown 357	-	28,220
10495	C.I. Acid Orange 7	633-96-5	58,211
10500	C.I. Acid Orange 8	5850-86-2	6,658
10525	C.I. Acid Orange 60	30112-70-0	7,275
10530	C.I. Acid Orange 61	6408-33-9	8,598[b]
10550	C.I. Acid Orange 107	-	5,510
10560	C.I. Acid Orange 144	-	8,500
10575	C.I. Acid Red 14	3567-69-9	18,078
10625	C.I. Acid Red 57	12217-34-4	31,020

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

c. Includes both C.I. Acid Blue 158 and 158:1.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 2. Monazo Dyes and Pigments (continued)			
10615	C.I. Acid Red 131	-	10,318
10625	C.I. Acid Red 138	15792-43-5	14,328
10660	C.I. Acid Red 251	-	5,600
10665	C.I. Acid Red 257	12217-36-6	7,407
10675	C.I. Acid Red 266	57741-47-6	7,496
10690	C.I. Acid Red 296	38833-00-0	16,612
10700	C.I. Acid Red 312	-	7,500
10705	C.I. Acid Red 316	-	7,981
10720	C.I. Acid Red 359	-	15,000
10725	C.I. Acid Red 361	-	377,563
10730	C.I. Acid Red 379	-	5,500
10760	C.I. Acid Violet 90	-	6,300
10765	C.I. Acid Violet 121	-	8,960
10780	C.I. Acid Yellow 19	12220-64-3	42,109
10805	C.I. Acid Yellow 36	587-98-4	16,864
10815	C.I. Acid Yellow 54	10127-05-6	5,940[b]
10830	C.I. Acid Yellow 99	10343-58-5	10,725[b]
10835	C.I. Acid Yellow 101	-	35,640[b]
10840	C.I. Acid Yellow 121	-	11,500
10860	C.I. Acid Yellow 137	-	56,480
10865	C.I. Acid Yellow 151	12715-61-6	6,215
10870	C.I. Acid Yellow 155	-	6,834
10890	C.I. Acid Yellow 221	-	10,450[b]
10895	C.I. Basic Blue 41	12270-13-2	6,050[b]
10900	C.I. Basic Blue 54	15000-59-6	12,562
10905	C.I. Basic Blue 71	-	33,750[b]
10955	C.I. Basic Red 22	12221-52-2	12,194[b]
10965	C.I. Basic Red 29	42373-04-6	59,468

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 2. Monazo Dyes and Pigments (continued)			
10975	C.I. Basic Red 46	12270-28-9	94,495
10980	C.I. Basic Red 54	-	5,179
10985	C.I. Basic Red 58	-	11,250[b]
11010	C.I. Basic Violet 37	-	22,095
11020	C.I. Basic Yellow 19	-	7,800
11025	C.I. Basic Yellow 24	52435-14-0	5,501[b]
11030	C.I. Basic Yellow 25	41025-67-6	36,577
11035	C.I. Basic Yellow 39	-	5,749
11125	C.I. Disperse Blue 79	-	11,023
11130	C.I. Disperse Blue 82	-	5,071
11135	C.I. Disperse Blue 94	-	7,315
11145	C.I. Disperse Blue 122	12270-38-1	149,912
11155	C.I. Disperse Blue 130	-	10,801
11160	C.I. Disperse Blue 148	-	75,748
11165	C.I. Disperse Blue 165	41642-51-7	59,190
11175	C.I. Disperse Blue 183	2309-94-6	17,638
11180	C.I. Disperse Blue 200	-	41,666
11205	C.I. Disperse Brown 5	-	7,714
11225	C.I. Disperse Orange 25	31482-56-1	8,368
11235	C.I. Disperse Orange 31	61968-38-5	6,468
11260	C.I. Disperse Orange 56	-	9,149[b]
11285	C.I. Disperse Orange 80	-	51,588
11325	C.I. Disperse Red 13	3180-81-2	7,055
11345	C.I. Disperse Red 46	-	12,876
11365	C.I. Disperse Red 72	12223-39-1	14,768
11370	C.I. Disperse Red 73	16889-10-4	10,726
11460	C.I. Disperse Violet 33	-	21,495
11475	C.I. Disperse Yellow 3	2832-40-8	24,631

a. All data are for 1979 unless otherwise indicated

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 2. Monazo Dyes and Pigments (continued)			
11480	C.I. Disperse Yellow 4	-	24,252
11490	C.I. Disperse Yellow 119	57308-41-5	5,567
11515	C.I. Disperse Yellow 198	-	27,291
11520	C.I. Mordant Black 9	2052-25-7	94,936
11525	C.I. Mordant Black 11	1787-61-7	56,964
11565	C.I. Mordant Orange 3	6359-86-0	6,250
11605	C.I. Mordant Yellow 30	10482-43-6	6,174
11620	C.I. Pigment Brown 25	6992-11-6	53,196
11645	C.I. Pigment Orange 5	3468-63-1	17,086
11655	C.I. Pigment Orange 36	12236-62-3	260-526
11660	C.I. Pigment Orange 38	12236-64-5	40,596
11680	C.I. Pigment Red 3	2425-85-6	122,752
11700	C.I. Pigment Red 7	6471-51-8	11,015
11705	C.I. Pigment Red 9	6410-38-4	21,129
11715	C.I. Pigment Red 14	6471-50-7	11,024
11755	C.I. Pigment Red 48	3564-21-4	17,820
11760	C.I. Pigment Red 48:1	7585-41-3	14,521
11765	C.I. Pigment Red 48:2	7023-61-2	76,370
11780	C.I. Pigment Red 49	1248-18-6	17,402
11785	C.I. Pigment Red 49:1	1103-38-4	175,270
11790	C.I. Pigment Red 49:2	1103-39-5	19,045
11805	C.I. Pigment Red 53	2092-56-0	16,905[b]
11810	C.I. Pigment Red 53:1	5160-02-1	34,928
11820	C.I. Pigment Red 57	5858-81-1	28,738
11825	C.I. Pigment Red 57:1	5281-04-9	18,905
11845	C.I. Pigment Red 68	5850-80-6	314,330
11850	C.I. Pigment Red 112	6535-46-6	10,164
11855	C.I. Pigment Red 146	5280-68-2	30,938

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 2. Monazo Dyes and Pigments (continued)			
11860	C.I. Pigment Red 151	61013-97-6	11,110
11865	C.I. Pigment Red 170	2786-76-7	102,092
11870	C.I. Pigment Red 171	6985-95-1	7,157
11875	C.I. Pigment Red 175	6985-92-8	8,800[b]
11890	C.I. Pigment Red 185	61951-98-2	11,000
11895	C.I. Pigment Red 187	61036-89-3	83,692
11900	C.I. Pigment Red 188	61847-48-1	23,475
11905	C.I. Pigment Red 199	-	44,000
11910	C.I. Pigment Red 208	-	9,190
11920	C.I. Pigment Yellow 1	2512-29-0	54,852
11930	C.I. Pigment Yellow 3	6486-23-3	23,210
11950	C.I. Pigment Yellow 10	-	57,799[b]
11965	C.I. Pigment Yellow 62:1	-	18,773
11975	C.I. Pigment Yellow 73	13515-40-7	11,133
11980	C.I. Pigment Yellow 74	6358-31-2	5,502
12005	C.I. Pigment Yellow 151	-	45,109
12010	C.I. Pigment Yellow 154	-	44,021
12015	C.I. Reactive Blue 13	-	7,645
12020	C.I. Reactive Brown 10	12225-67-1	10,031
12060	C.I. Reactive Orange 82	-	17,614
12085	C.I. Reactive Red 21	12769-05-0	79,523
12095	C.I. Reactive Red 40	-	42,990
12110	C.I. Reactive Red 49	-	21,165
12115	C.I. Reactive Red 55	-	14,991
12120	C.I. Reactive Red 84	-	6,830[b]
12125	C.I. Reactive Red 105	-	13,228
12130	C.I. Reactive Red 123	-	20,282
12150	C.I. Reactive Yellow 2	50662-99-2	11,873

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 2. Monazo Dyes and Pigments (continued)			
12210	C.I. Solvent Black 1	-	22,046
12215	C.I. Solvent Black 2	-	15,212[b]
12220	C.I. Solvent Black 34	32517-36-5	9,272
12225	C.I. Solvent Brown 35	-	5,291
12255	C.I. Solvent Red 7	-	5,235
12270	C.I. Solvent Red 125	-	30,114
12290	C.I. Solvent Yellow 14	842-07-9	25,016
12305	C.I. Solvent Yellow 25	-	6,723
12320	C.I. Solvent Yellow 82	-	6,897
12325	C.I. Solvent Yellow 83	-	6,724
Subtask 3. Anthraquinone Dyes and Pigments			
12330	C.I. Acid Blue 14	12234-61-6	62,830
12340	C.I. Acid Blue 25	6408-78-2	21,880
12350	C.I. Acid Blue 40	6424-85-7	7,716
12365	C.I. Acid Blue 45	2861-02-1	11,199
12370	C.I. Acid Blue 62	4368-56-3	26,019[b]
12375	C.I. Acid Blue 71	2666-17-3	11,904
12380	C.I. Acid Blue 78	6424-75-5	38,685
12385	C.I. Acid Blue 80	4474-24-2	9,237
12390	C.I. Acid Blue 127	6471-01-8	8,111[b]
12395	C.I. Acid Blue 129	6397-02-0	8,955
12405	C.I. Acid Blue 175	12219-25-9	5,071
12410	C.I. Acid Blue 203	-	7,716
12415	C.I. Acid Blue 205	12238-92-5	15,438
12425	C.I. Acid Blue 239	12219-42-0	5,080
12430	C.I. Acid Blue 260	-	15,674
12435	C.I. Acid Blue 277	61967-93-9	63,601[b]

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 3. Anthraquinone Dyes and Pigments (continued)			
12440	C.I. Acid Blue 288	61967-95-1	8,301
12445	C.I. Acid Blue 290	39280-53-0	17,831
12455	C.I. Acid Green 25	4403-90-1	5,962[b]
12480	C.I. Basic Blue 22	-	36,596
12530	C.I. Disperse Blue 1	2475-45-8	22,311
12535	C.I. Disperse Blue 3	2475-46-9	13,007
12545	C.I. Disperse Blue 19	4395-65-7	35,164
12550	C.I. Disperse Blue 76	3860-63-7	194,336
12560	C.I. Disperse Blue 35	12222-75-2	117,065
12570	C.I. Disperse Blue 56	12217-79-7	87,578
12575	C.I. Disperse Blue 60	12217-80-0	90,098
12590	C.I. Disperse Blue 72	81-48-1	7,438
12595	C.I. Disperse Blue 73	12222-78-5	15,451
12610	C.I. Disperse Blue 83	12222-81-0	19,514[b]
12615	C.I. Disperse Blue 87	12222-85-4	126,142
12620	C.I. Disperse Blue 93	12235-95-9	12,566
12625	C.I. Disperse Blue 95	12235-97-1	35,454[b]
12645	C.I. Disperse Blue 126	-	5,397
12650	C.I. Disperse Blue 127	12270-40-5	19,379
12655	C.I. Disperse Blue 185	61986-36-3	8,266
12665	C.I. Disperse Blue 198	-	55,266
12670	C.I. Disperse Blue 288	-	6,394[b]
12675	C.I. Disperse Blue 289	-	15,503
12685	C.I. Disperse Red 4	2379-90-0	5,500[b]
12715	C.I. Disperse Red 60	17418-58-5	48,653
12725	C.I. Disperse Red 91	12236-10-1	115,905
12730	C.I. Disperse Red 92	12236-11-2	58,216
12765	C.I. Disperse Red 277	-	7,700

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 3. Anthraquinone Dyes and Pigments (continued)			
12770	C.I. Disperse Red 302	-	6,284
12780	C.I. Disperse Violet 8	82-33-7	5,070[b]
12805	C.I. Disperse Violet 31	12239-36-0	24,340
12810	C.I. Disperse Violet 35	-	24,586
12825	C.I. Disperse Violet 57	-	5,822
12885	C.I. Pigment Red 149	4948-15-6	10,272
12895	C.I. Pigment Red 177	4051-63-2	136,987
12905	C.I. Pigment Red 179	5521-31-3	23,786
12920	C.I. Pigment Red 224	-	9,338
12945	C.I. Pigment Violet 31	1324-55-6	6,194
12950	C.I. Pigment Yellow 24	475-71-8	9,966
12970	C.I. Reactive Blue 19	2580-78-1	10,241
12975	C.I. Reactive Blue 27	20640-71-5	22,261
12985	C.I. Reactive Blue 50	-	13,562[b]
12990	C.I. Reactive Blue 69	-	10,825[b]
12995	C.I. Reactive Blue 74	-	5,842[b]
13000	C.I. Reactive Blue 114	-	19,523
13015	C.I. Solvent Blue 35	17354-14-2	5,830
13045	C.I. Solvent Red 111	82-38-2	19,549
13055	C.I. Solvent Violet 13	81-48-1	5,101
13075	C.I. Vat Black 16	1328-19-4	11,025
13095	C.I. Vat Black 27	2379-81-9	10,734
13100	C.I. Vat Black 30	-	11,213
13105	C.I. Vat Blue 4	81-77-6	76,358
13110	C.I. Vat Blue 6	130-20-1	94,555
13115	C.I. Vat Blue 16	6424-76-6	11,905
13120	C.I. Vat Blue 18	1324-54-5	11,980[b]
13130	C.I. Vat Blue 20	116-71-2	10,282[b]

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 3. Anthraquinone Dyes and Pigments (continued)			
13135	C.I. Vat Blue 66	57456-24-3	42,312
13140	C.I. Vat Brown 1	2475-33-4	23,157[b]
13145	C.I. Vat Brown 3	131-92-0	30,430
13165	C.I. Vat Brown 33	61902-46-3	21,707
13170	C.I. Vat Green 1	128-58-5	83,667
13195	C.I. Vat Green 28	61931-58-6	12,533
13205	C.I. Vat Orange 1	1324-11-4	7,705[b]
13210	C.I. Vat Orange 2	1324-35-2	106,857
13225	C.I. Vat Orange 7	4424-06-0	50,406
13235	C.I. Vat Orange 15	2379-78-4	12,538
13240	C.I. Vat Red 10	2379-79-5	109,880[b]
13260	C.I. Vat Red 32	2379-77-3	17,458
13265	C.I. Vat Violet 1	1324-55-6	14,367
13270	C.I. Vat Violet 9	1324-17-0	11,550
13275	C.I. Vat Violet 13	4424-87-7	5,060
13285	C.I. Vat Yellow 1	475-71-8	7,715
13295	C.I. Vat Yellow 4	128-66-5	11,033[b]
13305	C.I. Vat Yellow 20	4216-01-7	11,000
13320	C.I. Vat Yellow 46	12237-50-2	10,788
Subtask 4. Part 1. Disazo Dyes and Pigments			
13325	C.I. Acid Black 1	1064-48-8	68,175
13330	C.I. Acid Black 24	3071-73-6	14,924[b]
13345	C.I. Acid Blue 113	3351-05-1	43,404
13355	C.I. Acid Blue 120	3529-01-9	7,804[b]
13365	C.I. Acid Brown 83	-	10,119
13370	C.I. Acid Brown 158	-	14,241
13420	C.I. Acid Orange 156	-	7,511

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 4. Part 1. Disazo Dyes and Pigments (continued)			
13440	C.I. Acid Red 119	12220-20-1	5,487[b]
13450	C.I. Acid Red 145	6598-62-5	5,069
13455	C.I. Acid Red 151	6406-56-0	51,580
13460	C.I. Acid Red 299	12220-29-0	13,866
13525	C.I. Direct Blue 229	-	8,818
13545	C.I. Direct Brown 50	-	11,000
13550	C.I. Direct Brown 223	-	5,060[b]
13555	C.I. Direct Brown 228	-	6,490[b]
13590	C.I. Direct Orange 118	-	5,115
14005	C.I. Direct Red 23	3441-14-3	19,091
14050	C.I. Direct Red 79	1937-34-4	26,387
14115	C.I. Direct Yellow 12	2870-32-8	18,719
14130	C.I. Direct Yellow 50	-	8,818
14160	C.I. Direct Yellow 133	-	8,847
14195	C.I. Disperse Red 151	-	29,782
14245	C.I. Pigment Brown 23	-	4,012
14250	C.I. Pigment Orange 15	6358-88-9	1,190[b]
14255	C.I. Pigment Orange 31	-	25,970
14260	C.I. Pigment Red 144	5280-78-4	179,009
14270	C.I. Pigment Red 220	-	5,062
14275	C.I. Pigment Red 221	-	21,274
14280	C.I. Pigment Yellow 16	5979-28-2	37,999
14285	C.I. Pigment Yellow 81	22094-93-5	31,935
14290	C.I. Pigment Yellow 83	5567-15-7	91,243
14295	C.I. Pigment Yellow 93	5580-57-4	242,339
	C.I. Pigment Yellow 93 (<90% concentration)		149,906
14300	C.I. Pigment Yellow 94	5580-58-5	1,289
14305	C.I. Pigment Yellow 95	5280-80-8	90,511

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 4. Part 1. Disazo Dyes and Pigments (continued)			
14310	C.I. Pigment Yellow 106	-	1,100
14315	C.I. Pigment Yellow 121	-	9,921
14320	C.I. Pigment Yellow 126	-	3,307
14325	C.I. Pigment Yellow 127	-	7,157
14330	C.I. Pigment Yellow 128	-	1,102
14335	C.I. Reactive Black 5	17095-24-8	56,273
14345	C.I. Reactive Blue 26	-	7,054
14350	C.I. Reactive Blue 52	-	33,806
14355	C.I. Reactive Blue 73	-	17,857
14370	C.I. Reactive Brown 7	-	6,590
14380	C.I. Reactive Brown 23	-	9,920
14385	C.I. Reactive Red 141	-	5,181
14390	C.I. Reactive Yellow 64	-	12,734
14395	C.I. Solvent Black 3	4197-25-5	21,703
14420	C.I. Solvent Red 24	85-83-6	21,067
Subtask 4. Part 2. Trisazo, Polyazo, and Unspecified Azo Dyes and Pigments			
14490	C.I. Acid Black 131	-	64,584
14495	C.I. Acid Black 132	12219-02-0	26,391
14500	C.I. Acid Black 164	-	16,500
14505	C.I. Acid Black 170	-	12,565
14510	C.I. Acid Black 194	-	53,631
14515	C.I. Acid Blue 151	-	6,560[b]
14520	C.I. Acid Brown 85	6473-02-5	9,515
14535	C.I. Acid Brown 235	-	9,699
14540	C.I. Acid Brown 239	-	18,298[b]
14545	C.I. Acid Brown 264	-	37,785
14550	C.I. Acid Brown 267	-	6,062

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 4. Part 2. Trisazo, Polyazo, and Unspecified Azo Dyes and Pigments (continued)			
14555	C.I. Acid Brown 289	-	8,333
14560	C.I. Acid Brown 290	-	8,800
14565	C.I. Acid Brown 298	-	7,439[b]
14570	C.I. Acid Brown 311	-	8,158
14575	C.I. Acid Brown 314	-	5,582[b]
14580	C.I. Acid Brown 321	-	11,825
14585	C.I. Acid Brown 322	-	19,800
14590	C.I. Acid Brown 355	-	86,962
14595	C.I. Acid Brown 360	-	15,432
14600	C.I. Acid Brown 362	-	11,243
14605	C.I. Acid Green 104	-	8,910
14615	C.I. Acid Red 282	-	6,600[b]
14620	C.I. Acid Red 283	-	20,400
14625	C.I. Acid Red 310	-	14,245
14630	C.I. Acid Red 362	-	8,800
14635	C.I. Acid Red 392	-	7,055[b]
14640	C.I. Acid Yellow 59	-	13,860
14645	C.I. Acid Yellow 70	-	9,039
14655	C.I. Acid Yellow 135	-	32,406
14660	C.I. Acid Yellow 199	-	20,503
14680	C.I. Basic Orange 40	-	9,955[b]
14685	C.I. Basic Red 51	-	15,695
14690	C.I. Basic Violet 35	-	14,738
14700	C.I. Direct Black 19	6428-31-5	13,669[b]
14705	C.I. Direct Black 22	6473-13-8	5,512
14710	C.I. Direct Black 33	-	22,046[b]
14725	C.I. Direct Black 112	12217-52-6	7,936
14735	C.I. Direct Blue 78	2503-73-3	8,922

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 4. Part 2. Trisazo, Polyazo, and Unspecified Azo Dyes and Pigments (continued)			
14740	C.I. Direct Blue 120	3626-40-2	6,000[b]
14755	C.I. Direct Blue 200	-	11,125
14760	C.I. Direct Blue 211	-	5,269
14790	C.I. Direct Green 67	-	6,684
14800	C.I. Direct Green 89	-	48,428
14805	C.I. Direct Orange 107	-	7,495
14825	C.I. Direct Red 221	-	31,194
14827	C.I. Direct Red 233	-	7,893
14845	C.I. Disperse Blue 42	-	9,261
14880	C.I. Disperse Blue 284	-	46,076
14885	C.I. Disperse Blue 285	-	18,739
14895	C.I. Disperse Blue 295	-	7,455[b]
14915	C.I. Disperse Brown 19	-	53,572
14920	C.I. Disperse Green 9	-	54,012
14930	C.I. Disperse Orange 55	-	19,580
14960	C.I. Disperse Orange 127	-	14,827[b]
14975	C.I. Disperse Orange 139	-	5,511
14980	C.I. Disperse Red 118	-	9,306
15005	C.I. Disperse Red 167	-	37,478
15040	C.I. Disperse Red 278	-	93,475
15055	C.I. Disperse Red 311	-	20,262
15090	C.I. Disperse Yellow 114	-	60,273
15095	C.I. Disperse Yellow 126	-	27,403
15100	C.I. Disperse Yellow 183	-	38,801
15110	C.I. Pigment Orange 62	-	2,750
15115	C.I. Pigment Red 214	-	5,511
15120	C.I. Pigment Red 242	-	2,205
15125	C.I. Pigment Yellow 150	-	1,014

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 4. Part 2. Trisazo, Polyazo, and Unspecified Azo Dyes and Pigments (continued)			
15130	C.I. Reactive Blue 8	-	29,546
15135	C.I. Reactive Blue 10	-	27,389
15140	C.I. Reactive Blue 39	-	9,039
15145	C.I. Reactive Blue 40	-	18,022[b]
15150	C.I. Reactive Blue 65	-	10,582
15155	C.I. Reactive Blue 78	-	7,165
15160	C.I. Reactive Blue 79	-	6,943
15175	C.I. Reactive Blue 137	-	33,006
15180	C.I. Reactive Blue 160	-	12,511
15185	C.I. Reactive Blue 171	-	5,054[b]
15195	C.I. Reactive Orange 11	-	14,331
15200	C.I. Reactive Orange 20	-	8,949
15205	C.I. Reactive Orange 35	-	8,598
15210	C.I. Reactive Orange 64	-	26,015
15215	C.I. Reactive Orange 70	-	6,333
15245	C.I. Reactive Red 56	-	7,827
15255	C.I. Reactive Red 119	-	8,488
15260	C.I. Reactive Red 120	-	31,434[b]
15265	C.I. Reactive Red 152	-	24,740
15275	C.I. Reactive Violet 6	-	6,092
15285	C.I. Reactive Yellow 29	-	8,863
15290	C.I. Reactive Yellow 35	-	7,824[b]
15295	C.I. Reactive Yellow 52	-	11,506
15300	C.I. Reactive Yellow 81	59112-78-6	23,036
15305	C.I. Reactive Yellow 85	-	6,131[b]
15330	C.I. Solvent Brown 42	-	9,756
15335	C.I. Solvent Brown 43	-	23,256

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 4. Part 2. Trisazo, Polyazo, and Unspecified Azo Dyes and Pigments (continued)			
15345	C.I. Solvent Orange 54	-	5,501
15350	C.I. Solvent Orange 59	-	16,136
15390	C.I. Solvent Yellow 88	-	31,162
Subtask 5. Part 1. Stilbene Dyes			
15400	C.I. Direct Yellow 11	1325-37-7	22,046
15460	C.I. Direct Black 62	-	5,290
15475	C.I. Fluorescent Brightener 28	4404-43-7	105,874
15480	C.I. Fluorescent Brightener 32	1264-32-0	9,811
15490	C.I. Fluorescent Brightener 47	-	7,835
15520	C.I. Fluorescent Brightener 119	-	22,376
15525	C.I. Fluorescent Brightener 121	12224-11-2	15,300
15550	C.I. Fluorescent Brightener 134	-	24,471
15560	C.I. Fluorescent Brightener 191	-	25,595
15565	C.I. Fluorescent Brightener 199	-	5,940
15575	C.I. Fluorescent Brightener 238	-	20,066
15580	C.I. Fluorescent Brightener 312	-	10,065
15585	C.I. Fluorescent Brightener 313	-	66,166
15590	C.I. Fluorescent Brightener 351	-	78,788

a. All data are for 1979 unless otherwise indicated.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 5. Part 2. Azoic Dye Components			
15595	C.I. Azoic Coupling Component 2	92-77-3	313,378
15605	C.I. Azoic Coupling Component 4	132-68-3	9,965
15610	C.I. Azoic Coupling Component 5	91-96-3	20,290
15635	C.I. Azoic Coupling Component 12	92-72-8	6,600
15640	C.I. Azoic Coupling Component 13	-	7,066
15645	C.I. Azoic Coupling Component 14	92-74-0	44,093
15650	C.I. Azoic Coupling Component 15	-	5,000[b]
15655	C.I. Azoic Coupling Component 17	135-65-9	44,092
15660	C.I. Azoic Coupling Component 18	135-61-5	68,122
15670	C.I. Azoic Coupling Component 20	135-62-6	100,519
15675	C.I. Azoic Coupling Component 21	135-63-7	17,319
15685	C.I. Azoic Coupling Component 34	137-52-0	60,619
15700	C.I. Azoic Coupling Component 44	4433-79-8	5,512
15715	C.I. Azoic Diazo Component 1, base	96-96-8	61,181
15725	C.I. Azoic Diazo Component 5, base	27761-26-8	63,350
15730	C.I. Azoic Diazo Component 8, base	89-62-3	872,202
15735	C.I. Azoic Diazo Component 9, base	89-63-4	180,246

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 5. Part 2. Azoic Dye Components (continued)			
15745	C.I. Azoic Diazo Component 13, base	27165-17-9	80,045
15755	C.I. Azoic Diazo Component 20, base	15518-68-0	28,297
15760	C.I. Azoic Diazo Component 32, base	6259-42-3	33,057
15765	C.I. Azoic Diazo Component 34, base	-	65,699
15780	C.I. Azoic Diazo Component 5, salt	27761-26-3	5,000
Subtask 6. Part 1. Triaryl- and Diphenylmethane Dyes and Pigments			
15860	C.I. Acid Blue 1	129-17-9	8,767
15885	C.I. Acid Blue 83	6104-59-2	17,342
15890	C.I. Acid Blue 90	6104-58-1	7,853
15910	C.I. Acid Green 16	12768-78-4	7,716
15935	C.I. Basic Blue 7	2390-60-5	43,450
15945	C.I. Basic Blue 26	2580-56-5	21,714
15950	C.I. Basic Blue 55	-	6,050
15955	C.I. Basic Blue 77	-	6,680
15960	C.I. Basic Blue 81	-	6,490
15965	C.I. Basic Green 1	633-03-4	5,392[b]
15970	C.I. Basic Green 4	569-64-2	166,676
15975	C.I. Basic Violet 1	8004-87-3	41,336
15980	C.I. Basic Violet 2	3248-91-7	22,598
15985	C.I. Basic Violet 3	548-62-9	32,362
15995	C.I. Basic Violet 14	632-99-5	18,460
16005	C.I. Basic Yellow 2	2465-27-2	165,278
16020	C.I. Mordant Blue 1	1796-92-5	13,075
16050	C.I. Pigment Blue 19	58569-23-6	3,500

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 6. Part 1. Triaryl- and Diphenylmethane Dyes and Pigments (continued)			
16060	C.I. Pigment Blue 50	-	25,742
16090	C.I. Pigment Violet 27	12237-62-6	3,564
16125	C.I. Solvent Violet 8	52080-58-7	20,069
Subtask 6. Part 2. Xanthene Dyes			
16135	C.I. Acid Red 52	3520-42-1	8,324
16150	C.I. Basic Red 1	989-38-8	152,191
16155	C.I. Basic Red 1:1	-	12,650
16160	C.I. Basic Violet 10	81-88-9	171,664
16165	C.I. Basic Violet 11	2390-63-8	25,300
16220	FD&C Red 3	6423-68-0	54,261
16225	C.I. Disperse Yellow 199	-	6,615
16230	C.I. Mordant Red 27	6359-22-4	5,500
16260	C.I. Solvent Red 49	509-34-2	54,829[b]
Subtask 7. Part 1. Acridine, Quinoline, Methine, and Thiazole Dyes and Pigments			
16275	C.I. Acid Yellow 3	8004-92-0	5,274[b]
16280	C.I. Basic Blue 62	-	5,182
16285	C.I. Basic Blue 69	12235-47-1	14,439
16360	C.I. Basic Yellow 40	-	13,392
16365	C.I. Basic Yellow 45	-	15,587
16370	C.I. Basic Yellow 49	-	12,100
16395	C.I. Basic Yellow 70	-	5,280
16410	C.I. Direct Red 9	-	27,665
16425	C.I. Disperse Yellow 54	7576-65-0	15,484[b]
16440	C.I. Disperse Yellow 82	-	9,101[b]

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 7. Part 1. Acridine, Quinoline, Methine, and Thiazole Dyes and Pigments (continued)			
16455	C.I. Disperse Yellow 99	25857-05-0	23,249
16460	C.I. Disperse Yellow 116	-	6,956[b]
16505	C.I. Fluorescent Brightener 352	-	20,066
16510	C.I. Pigment Violet 19	1047-16-1	54,813
16515	C.I. Pigment Yellow 101	2387-03-3	6,710
16520	C.I. Pigment Yellow 117	-	15,664
16525	C.I. Pigment Yellow 129	-	8,380
16530	C.I. Pigment Yellow 139	-	12,540
16540	C.I. Solvent Yellow 79	-	5,445[b]
16545	C.I. Solvent Yellow 93	-	7,602
Subtask 7. Part 2. Azine, Oxazine, Thiazine, and Triazine Dyes and Pigments			
16550	C.I. Acid Black 2	8005-03-6	11,134[b]
16565	C.I. Basic Blue 9	61-73-4	30,701
16580	C.I. Basic Blue 141	-	7,950
16590	C.I. Direct Blue 106	6527-70-4	24,489
16595	C.I. Direct Blue 108	1324-58-9	50,844
16600	C.I. Direct Blue 109	33700-25-3	30,621
16605	C.I. Fluorescent Brightener 179	-	17,748
16610	C.I. Pigment Black 1	13007-86-8	5,940
16615	C.I. Pigment Violet 23	6358-30-1	22,199
16620	C.I. Pigment Violet 37	-	2,204
16625	C.I. Solvent Black 5	11099-03-9	133,228
16630	C.I. Solvent Black 7	8005-02-5	826,888
16635	C.I. Solvent Blue 7	8004-98-6	17,939

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 7. Part 3. Nitro and Nitroso Dyes and Pigments			
16645	C.I. Acid Orange 3	6373-74-6	12,018
16680	C.I. Pigment Brown 22	-	110,230
16685	C.I. Pigment Green 8	16143-80-9	5,808
Subtask 8. Part 1. Sulfur Dyes			
16845	C.I. Solubilized Sulfur Black 1	-	76,934
Subtask 8. Part 2. Aminoketone, Indigoid, and Phthalocyanine Dyes and Pigments			
16895	FD&C Blue 2	-	17,867
16900	C.I. Direct Blue 86	-	7,290
16910	C.I. Direct Blue 199	-	42,279
16915	C.I. Direct Blue 262	-	29,762
16925	C.I. Ingrain Blue 2	-	13,144
16930	C.I. Pigment Blue 15	-	1,502,541
16935	C.I. Pigment Blue 15:1	-	43,979
16940	C.I. Pigment Blue 15:2	-	12,482
16945	C.I. Pigment Blue 15:3	-	58,452
16950	C.I. Pigment Blue 15:4	-	54,999
16955	C.I. Pigment Blue 16	-	1,939[b]
16965	C.I. Pigment Green 7	-	323,262
16970	C.I. Pigment Green 36	14302-13-7	159,184
16980	C.I. Pigment Red 88	14295-43-3	9,910
16985	C.I. Pigment Red 122	-	19,897
16990	C.I. Pigment Red 181	-	4,067
16995	C.I. Pigment Red 209	3089-17-6	8,042
17005	C.I. Reactive Blue 7	12238-09-4	8,818

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 8. Part 2. Aminoketone, Indigoid, and Phthalocyanine Dyes and Pigments (continued)			
17010	C.I. Reactive Blue 18	-	31,194
17015	C.I. Reactive Blue 21	-	23,355
17030	C.I. Reactive Blue 71	-	18,518
17035	C.I. Reactive Blue 140	-	18,517
17045	C.I. Reactive Green 12	-	49,418
17050	C.I. Solvent Blue 67	-	5,732[b]
17055	C.I. Solvent Blue 70	-	9,900
17065	C.I. Vat Blue 1	-	3,531,492[d]
17070	C.I. Vat Blue 5	-	15,628
17090	C.I. Vat Red 1	-	11,961
Subtask 9. Dyes and Pigments of Undisclosed (Proprietary) Structure			
17115	C.I. Acid Black 64	-	7,827
17120	C.I. Acid Black 67	-	16,819
17125	C.I. Acid Black 77	-	7,000[b]
17130	C.I. Acid Blue 72	-	7,274[b]
17140	C.I. Acid Blue 133	-	16,500
17145	C.I. Acid Blue 140	-	11,021
17150	C.I. Acid Blue 171	-	5,556[b]
17160	C.I. Acid Blue 209	-	7,260
17170	C.I. Acid Brown 11	-	6,613
17185	C.I. Acid Brown 44	-	6,813
17195	C.I. Acid Brown 50	-	43,890
17200	C.I. Acid Brown 58	-	10,119
17205	C.I. Acid Brown 101	-	6,614

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

d. Estimated. Quantity represents computed weights based on standard concentration of 20 percent active ingredient in commercial product.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 9. Dyes and Pigments of Undisclosed (Proprietary) Structure (continued)			
17210	C.I. Acid Brown 104	-	10,251
17215	C.I. Acid Brown 106	-	21,495
17220	C.I. Acid Brown 147	-	85,979
17225	C.I. Acid Brown 159	-	11,000
17230	C.I. Acid Brown 160	-	16,500
17235	C.I. Acid Brown 161	-	55,540
17240	C.I. Acid Brown 162	-	47,300
17245	C.I. Acid Brown 163	-	26,050
17250	C.I. Acid Brown 165	-	17,100
17255	C.I. Acid Brown 180	-	45,965
17257	C.I. Acid Brown 188	-	14,992
17260	C.I. Acid Brown 189	-	65,256
17265	C.I. Acid Brown 191	-	17,857[b]
17270	C.I. Acid Brown 282	-	12,733
17275	C.I. Acid Brown 283 (Cr complex)	-	5,038[b]
17280	C.I. Acid Green 26	-	7,150
17285	C.I. Acid Green 28	-	18,297
17295	C.I. Acid Orange 78	-	7,700
17305	C.I. Acid Orange 89	-	24,288
17310	C.I. Acid Red 119	-	5,487[b]
17325	C.I. Acid Red 226	-	64,015
17330	C.I. Acid Red 227	-	41,844
17345	C.I. Acid Yellow 96	-	5,500
17350	C.I. Acid Yellow 118	-	11,689
17355	C.I. Acid Yellow 119	-	7,468
17360	C.I. Azoic Diazo Component 121	-	7,054

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

Entry ID	Colour Index Name	CAS Number	U.S. Imports[a] (through principal U.S. customs districts, lbs)
Subtask 9. Dyes and Pigments of Undisclosed (Proprietary) Structure (continued)			
17375	C.I. Direct Brown 103	-	10,860
17380	C.I. Direct Brown 113	-	6,172
17385	C.I. Direct Brown 115	-	31,964
17390	C.I. Direct Brown 116	-	13,463
17395	C.I. Direct Brown 157	-	59,032
17400	C.I. Direct Red 92	-	7,493
17420	C.I. Disperse Red 44	-	15,484
17425	C.I. Disperse Red 74	-	58,527
17440	C.I. Mordant Black 75	-	17,416
17445	C.I. Pigment Yellow 152	-	1,764[b]
17455	C.I. Solvent Black 27	-	16,588
17460	C.I. Solvent Black 28	-	15,301
17465	C.I. Solvent Black 29	-	18,518
17470	C.I. Solvent Blue 48	-	12,017
17495	C.I. Solvent Orange 25	-	6,018[b]

a. All data are for 1979 unless otherwise indicated.

b. Data are for 1978.

APPENDIX B

CODES TO PRODUCTION RANGES IN THE ODPDB

Code Letter	1977 Annual U.S. Production Range (pounds of organic dye in commercial product)
A	None
B	Under 1,000
C	1,000-10,000
D	10,000-100,000
E	100,000-1 million
F	1 million-10 million
G	10 million-50 million
H	50 million-100 million
I	100 million-500 million
J	500 million-1 billion
K	Over 1 billion
L	No report
M	Site limited

Source: USEPA. 1978. U.S. Environmental Protection Agency. Computer printout (CICIS): production statistics for chemicals in the nonconfidential initial TSCA inventory. Washington, DC: Office of Pesticides and Toxic Substances, USEPA.